

BUREAU OF MINES AUTHORIZATION AND OVERSIGHT

HEARING BEFORE THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES ONE HUNDRED FIRST CONGRESS

FIRST SESSION

MARCH 22, 1989

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BUREAU OF MINES AUTHORIZATION AND OVERSIGHT

WEDNESDAY, MARCH 22, 1989

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND
MATERIALS,
Washington, D. C.

The subcommittee met at 2:05 p.m. in Room 2325 of the Rayburn House Office Building, the Honorable Tim Valentine, chairman of the subcommittee, presiding.

Present: Representative Valentine.

Staff Present. Paul Maxwell and James Greene.

Mr. VALENTINE. (presiding) We might have to ask you to vacate some of the seats here so we will make room for the other members of the subcommittee as they come in.

Mr. Lewis I am told has been delayed and might not be here for this hearing. He is, I hope, taking my message to Mr. Gingrich that I was for him all the time.

[Laughter.]

Today we are considering the Bureau of Mines' proposed budget for FY 1990. Unfortunately, it follows the same pattern as in recent years with weakened funding for this important minerals and materials research agency.

The request level of \$141.7 million for FY 1990 is almost \$20 million, or 12 percent less than Congress approved for FY 1989. While the Minerals and Materials Research overall remains roughly even with last year, Health, Safety and Mining Technology is down by 27 percent and, once again, the Mineral Institutes program is targeted for extinction.

It is puzzling why the Bureau does so poorly in producing an aggressive research budget, particularly in comparison to the Department of Interior overall and to research agencies elsewhere in the federal government. For example, the Department is requesting a reduction of only 9 percent, while NASA, NSF, and DOE are seeing proposed increases of 22 percent, 14 percent, and 8 percent, respectively.

I am aware that Mr. T S Ary, the Director, has been in place only a relatively short time—one year this month—and that he attempted to do much better in terms of the Bureau's support in the requests to the Department and OMB. However, this budget appears to fall short, especially given the importance of minerals and basic materials to this nation.

Perhaps part of the problem is in understanding the goals and priorities of the Bureau overall. The present budget calls for a number of initiatives, from advanced materials and environmental concerns to innovative mining and processing technologies.

I hope to hear more about these initiatives and what has been left out as much as that which was left in the proposed budget.

I had an opportunity to meet with Mr. Ary recently in order to get acquainted with him and the Bureau's activities, and I found that we have a lot in common. I am looking forward to extending those discussions in today's hearings, and I am also looking forward to hearing from representatives of the American Mining Congress to get a sense of the private sector's views of the Bureau's activities and proposed budget.

In addition to Mr. Ary, we have Mr. Robert R. (Ray) Beebe, who will talk to us some today. But we will ask, Mr. Ary, if you will come up, please, sir, and I will introduce him again to everybody who is here. He is Director, Bureau of Mines, U.S. Department of Interior, and we welcome you again. Feel free to summarize your statement. It will appear in the record in toto, or otherwise proceed as you wish.

I understand you have some good news for us. You have been reappointed, have you not, by Mr. Manuel Lujan?

Mr. ARY. I understand the Press Secretary yesterday advised his group that I would be carried over. Mr. Lujan advised me yesterday afternoon, also, but I have not heard from the President yet.

Mr. VALENTINE. Well, that is merely a formality. I didn't know when that was greeted with such hushed moments of embarrassment, whether yours or mine—

[Laughter.]

I didn't know whether we had said the wrong thing or got the wrong message or that you had got the other message.

But I am sure that we will have the benefit of your knowledge and ability for a while longer.

We welcome you here, sir.

STATEMENT OF MR. T S ARY, DIRECTOR, BUREAU OF MINES, U.S. DEPARTMENT OF THE INTERIOR, 2401 E STREET, NW, WASHINGTON, D.C. 20240

Mr. ARY. Thank you, Mr. Chairman.

I appreciate the kind words, and I am really looking forward to staying on for additional time because we have started to do some things at the Bureau, and I would like to see finished up.

But I would like to read a short summary of the statement, and I appreciate the opportunity to appear before the subcommittee to discuss the Bureau of Mines' 1990 budget, which sets forth the priorities and the directions of the Bureau.

For 1990 we have a request of \$141 million, approximately, and we, like the U.S. minerals industry, have undergone a restructuring, and as a result the Bureau has sharpened its focus as we enter the decade of transition to the twenty-first century.

The Bureau's fiscal year 1990 budget continues to emphasize the major new initiative areas of advanced materials, regulatory issues, waste management and recovery, innovative mining and processing

technology, robotics, automation, and mineral land assessment which we presented to you in fiscal years '88 and '89, and we believe that these are innovative and exciting, long-term, high risk, and are really appropriately the role of the Federal Government.

Through these initiatives, the technology of the U.S. to deal with the problems in creative, innovative ways, and we think that in our research we are proposing new Bureau efforts to provide the essential technological and scientific knowledge through the innovative approaches and to lay the groundwork for applications to be developed by private industry.

And while these initiatives pose challenge of high risk and high reward, our highest priority is to resolve the health and safety and environmental issues which are identified by our researchers, the regulatory agents that we work with, and others with an interest in the mineral community.

Advances in the materials science stimulate the growth of many sectors of the economy, and the new materials and processes make existing industries more competitive and give birth to the new technology.

The Bureau's advanced materials efforts have a dual thrust, and they involve the research as well as the information and analysis efforts. The research efforts will focus on the advanced ceramics and intermetallic composites, which hold promise for important gains in wear and corrosion resistance and as substitutes for certain strategic and critical materials and metals applications.

The information and analysis program will seek to collect and disseminate data on advanced materials, to analyze supply and demand trends, analyze the role of advanced materials as substitutes for traditional minerals and materials and their impact on the national mineral industries and economy as well as efforts to quantify the effects of intermaterial competition.

In addition to the research side, during 1990 the Bureau expects to move its headquarters from Columbia Plaza to another location within the District, and we will also be phasing out our general purpose computer center in Denver.

The Bureau is also trying to phase out the helium operations, and we have made a recommendation to sell the helium plant and to privatize over a period of time and allow the private sector to increase their capacity to handle our government customers.

In addition to these two areas, we have also last year requested a one-time cost of \$3 million to handle the Superfund site in the Denver, Colorado area and, as a result of the activities that the EPA has there, they have identified a larger contaminated area and it is appearing that the costs are escalating on this, and so we are requesting an increase of 7.5 million in '90 so that we can continue with this.

We have not heard what the final cost of this is going to be because they have not yet located an area to dispose of the contaminated material. It is possible that we will be back and requesting additional funds because from my experience it is going to cost us quite a few more dollars to get that stuff hauled off and taken to a suitable site for recovery.

This is about the end of the prepared statement, and I would be more than glad to answer any questions, or try to.
[The prepared statement of Mr. Ary follows.]

Statement of
T S Ary
Director, Bureau of Mines
House Committee on Science, Space, and Technology
Subcommittee on Transportation, Aviation and Materials
March 22, 1989

Mr. Chairman, I appreciate the opportunity to appear before the subcommittee to discuss the Bureau of Mines fiscal year 1990 budget, which sets forth the proposed priorities and directions for the Bureau to carry out its mission. For FY 1990, the Bureau's Budget Request is \$141,197,000, which is almost \$15 million more than President Reagan's 1989 budget.

The Bureau of Mines, like the U.S. minerals industry, has undergone a restructuring. As a result, the Bureau has sharpened its focus to ensure an adequate and dependable supply of minerals and mineral-based materials to meet our economic and defense objectives as we enter the decade of transition to the 21st century. The Bureau carries out its mission by acquiring and analyzing global minerals data, by conducting research to enhance mining and mineral processing safety and efficiency, and by estimating the consequences of Federal policy options impacting the cost and availability of specific mineral commodities.

A continuing profile of our program finds significant attention is given to worker health and safety, to environmental compatibility of mining and mineral processing operations, to mineral resource accessibility and conservation, to innovations in the U.S. mining industry, and to the impact of regulations on mineral industries.

The Bureau's fiscal year 1990 budget continues to emphasize the major new initiative areas of advanced materials, regulatory issues, waste management and recovery, innovative mining and processing technology, robotics and automation, and mineral land assessments which we presented to you in fiscal years 1988 and 1989. We firmly believe that these are innovative, exciting, and cost effective approaches to health and safety, environmental protection, resource conservation, and efficiency improvement. These initiatives represent new approaches to push the state of the art and advance the technology of the United States to deal with these problems in creative and innovative ways. We are proposing new Bureau efforts to provide the essential technological and scientific knowledge to innovative approaches and to lay the groundwork for applications to be developed by private industry. The Bureau has already begun to move in these directions. With your continued support, we will continue that movement.

This budget continues those high priority initiatives contained in President Reagan's fiscal year 1989 budget. The redirection of existing resources has financed some of these initiatives in past years and will allow the Bureau to explore further initiatives in fiscal year 1990. We have added an initiative on Alaskan strategic and critical minerals within existing resources.

While such initiatives pose challenges of high-risk and high-reward, we will continue to maintain a base level of effort to solve high priority health, safety and environmental problems as they are identified by our researchers and the regulatory agencies, and to refine existing technologies to achieve additional improvements.

During FY 1990, the Bureau expects to move its headquarters from Columbia Plaza to another location within the District of Columbia and to phase out its general purpose computer center in Denver. Additional funds will be required for the Headquarters move and to obtain a minicomputer and software to meet the Bureau's internal ADP needs. These actions promise long-term savings, but impose some additional short-term costs.

The 1990 Budget assumes the sale of the Helium Program assets during fiscal year 1990, as part of the Administration's effort to shift government services to private providers. The goals of the Federal Helium program, conservation of helium to meet government needs and promotion of a viable private helium industry, have both been met. Therefore, we believe, and the Administration has concluded, that it is time for government to decrease its role as provider of helium to Federal agencies. Means of implementing the sale of the Helium program assets, and dealing with related issues, are still under review. I hope you will support us in this endeavor.

The Mineral Institute Program was initiated to provide seed money to encourage the development of mineral-related government/industry/university research and graduate education programs at selected State colleges and universities. The States have responded and the programs are in place. The majority of the support at these schools comes from non-Federal sources. Accordingly, this program is no longer an appropriate use of Federal funds, as State and private resources are adequate to continue the program at an appropriate level.

ADVANCED MATERIALS

Advanced materials are those developed during the past three decades, or still under development, such as advanced metals, ceramics, polymers, and composites, that exhibit greater strength, higher strength-density ratios, greater hardness, or superior thermal, electrical, optical, or chemical properties, when compared to traditional materials. Advanced materials promise to decrease energy consumption, improve performance at lower cost, and lessen dependence on imports of strategic and critical materials.

Advances in materials science stimulate the growth of many sectors of the economy. New materials and processes make existing industries more competitive and give birth to new technology. Encouragement or stimulation of the commercialization process through basic and applied research has been made a Federal responsibility through the enactment of several technology transfer and technology innovation statutes, and it is in this area that the Bureau's efforts are focused. The Bureau's Advanced Materials efforts have a dual thrust, involving both research and information and analysis efforts. The Information and Analysis program will seek to collect and disseminate data on advanced materials to analyze supply/demand trends, analyze the role of advanced materials as substitutes for traditional materials and their impacts on the Nation's mineral industries and economy, as well as efforts to quantify the effects of intermaterial competition. Research efforts will focus on advanced ceramics and intermetallic composites, which hold promise for important gains in wear and corrosion resistance and as substitutes for certain strategic and critical metal applications.

Competition between new and conventional materials for use in commercial products is affected by many factors including security of supply, environmental, health and safety, and economic implications across the entire materials cycle from mining to disposal (or recycle). Thus, many of the barriers to commercialization of new materials are not traditional areas of private sector research and development (R&D) activities and fall into the long-range, high-risk category that requires Federal involvement to achieve this important national objective.

REGULATORY ISSUES

Regulatory compliance has imposed major costs on the U.S. mineral industry. This trend is likely to continue, potentially affecting the competitive position of domestic producers. The objective of this initiative is to expand current regulatory analysis efforts in the Bureau's Information and Analysis Directorate to ensure that estimates of the economic benefits and costs of alternative regulations for the minerals industry are available to decisionmakers. The specific goals of these efforts ensure that regulations are adopted only after their effects have been fully considered so that they objectively: 1) are cost-effective, 2) fully consider competitiveness impacts, and 3) are technically sound.

In the environmental area, over the next several years, the Environmental Protection Agency (EPA) will undoubtedly develop a regulatory program for mine wastes and ambient air regulations for smelters. Proposed acid rain legislation may be passed by the Congress and certain States. These actions may prove costly to the domestic nonfuel mineral and coal industries. The potential costs to the domestic minerals industry of complying with these regulations could seriously impair the viability of some sectors.

The costs of compliance with proposed regulations depend on the specifics of proposed regulations, site-specific characteristics, and the relative competitive position of each producer. The Bureau's efforts will assist EPA's regulatory activities by accounting for site-specific differences, the relative competitive position of domestic producers, and the cost-effectiveness of alternative regulations. The cost and economic impact assessments proposed in this initiative will provide expanded site-specific analysis of alternative approaches to regulating mine and mineral processing wastes. The Bureau of Mines has extensive experience and expertise in this area, and is providing a valuable service to the decision-making process.

Likewise, anti-trust, taxation, and transportation regulations as they relate to the minerals industry also should be cost-effective. Current anti-trust policies were designed for the domestic economy of 100 years ago, and may no longer be appropriate for industries competing in world markets. Under this proposed effort, assessments of the impacts on the domestic minerals industry's competitiveness as well as alternative approaches in each of these three additional regulatory areas will be conducted.

WASTE MANAGEMENT AND RECOVERY

Mineral production results in the generation of vast quantities of wastes. Some of these wastes from active or abandoned mining, mineral processing, and metals recycling operations have the potential to cause serious hazards to human health and the environment. Regulations covering wastes from active mining and processing operations are currently under development by

EPA. Compliance with these regulations could be very costly and will require development of new waste management methods. An opportunity exists for conducting the research necessary to allow these new waste management methods to be developed before the new regulations take effect in the early 1990's.

The liability for permanent cleanup of waste from past operations is already mandated by Federal law. Slow progress on cleaning up hazardous waste sites has resulted in increasing public concern. Where cleanup has been attempted, costs have been astronomical with little guarantee of a permanent solution to the problem. In many cases, the technology required for permanent solutions simply does not exist. However, extensions of extractive metallurgical technology offer high potential for development of the necessary technology.

The Bureau is proposing to expand its efforts to develop methods to eliminate or reduce environmental problems associated with minerals wastes. Basic research in biotechnology will be expanded to take advantage of the fact that this technology offers excellent opportunities for extracting toxic metals from mining and mineral processing wastes. Additional research on new approaches to waste management and cleanup will be conducted on environmental problems caused by mine overburden, leaching residues, tailings, metallurgical processing wastes, and materials recycling wastes.

This research will produce improved scientific data on problems caused by mining, mineral processing, and recycling wastes; innovative approaches for managing and controlling these wastes that reduce the potential for environmental damage; new methods of employing biotechnology to decontaminate wastes containing low concentrations of toxic components; and generic cleanup technologies applicable to soil and water contamination of hazardous waste sites.

INNOVATIVE MINING AND PROCESSING TECHNOLOGY

The domestic mining industry has faced new challenges in recent years that, for some components, threatens its existence. To mount a serious attack on the economic problems of the mining industry while improving the health and safety of the mining labor force, the Bureau recognized that totally new ways to mine must be developed.

Previous Bureau of Mines research has shown that both copper and uranium can be dissolved from their respective host rocks underground, or in-situ. Thus, only a leach solution need be pumped underground and returned to the surface. The waste is left in place, eliminating mining, hauling, crushing, grinding, and smelting tons of solid materials that would require disposal ultimately. Major health, safety, energy consumption and environmental problems also appear to be eliminated. However, in-situ metal recovery poses a different set of problems. Present research focuses on finding solutions to critical technical problems hampering widespread adoption of in-situ leaching methods. The research includes solution control technology, methods for improving solution flow through a deposit, applications of biotechnology to improve leaching performance, potential application to strategic and critical metals, and evaluation of leaching technology for metals in deep, thin deposits. Parallel studies are identifying characteristics of ore deposits that determine amenability for leaching, and tracking the movement of leaching solutions through the

ground. Federal research will hopefully reduce the mounting environmental and social costs of conventional mining technology.

ROBOTICS AND AUTOMATION

Past Bureau efforts in robotics and automation have largely addressed mining health and safety issues. The objective of utilizing automation and robotics in the mining environment is to redeploy the mine worker to a safer, more healthful environment. Research has identified basic principles that can be utilized to make a coal mining machine guide itself while cutting coal, identify the edge of a coal seam, and diagnose electrical and mechanical failures. Present and planned research is to find the basis for technology through which these principles can be used to control a machine in real time. The Bureau will also expand its efforts in this area to include research to provide the technology necessary to apply robotics and automation to minerals beneficiation.

Bureau flotation research has resulted in new separation principles (control of the flotation response of a mineral without chemical modifiers and external generation of fixed diameter bubbles for column flotation) that can readily be automated. Bureau scientists, working with several sulfide mineral processors, have substantially completed research showing that flotation control without chemical modifiers is feasible for real ores under mill conditions; and that the flotation column can be computer controlled. However, before the industry can fully realize the benefits of these breakthroughs, several additional tasks must be addressed: mathematical algorithms must be developed that relate metal grade and recovery to the properties of the ore being separated and to the adjustable parameters of the separation process; and sensors must be devised to measure the adjustable parameters.

This research, started in 1968, has been highly successful. Additional research in the development of mathematical algorithms, in part controlled by artificial intelligence, is planned. Research will provide the technology base needed to automate advanced minerals recovery systems of the future. It will include investigations of use of artificial intelligence in control of operations and the sensor systems needed to measure appropriate control parameters. At the appropriate time, cooperative cost sharing with industrial producers will be sought to provide operational testing experience of this research and to expedite technology transfer.

MINERAL LAND ASSESSMENTS

The Bureau proposes to continue its efforts to estimate the potential supply of minerals from undiscovered as well as discovered deposits in the States of Nevada and Idaho. The potential value of mineral resources (discovered and undiscovered) to the local and State economies will also be estimated.

This assessment will be based on a unique analytical system, the Potential Supply Analysis System (PSAS), which uses the results of geologic field work and mineral production cost estimating procedures to estimate the quantities and values of the undiscovered minerals which may be contained in an area, and the number of additional jobs, income, and tax revenues that would be generated in the local and State economies if both undiscovered and discovered mineral resources were to be developed and produced.

Quantitative information about the opportunity cost of restricting access to lands which are favorable for undiscovered non-fuel minerals has never before been made available to land managers and public policy makers.

Several projects involving the Bureau, the US Geological Survey (USGS), the Alaska Division of Geological and Geophysical Surveys (ADGGS), and Idaho and Nevada State agencies have been completed or are underway. In a joint project with the USGS, the Bureau completed a pilot Potential Supply Analysis of the undiscovered gold and silver resources in the Tonopah Quadrangle of Nevada.

Under this initiative, the Bureau will provide potential supply analyses for the States of Idaho and Nevada, two mineral-rich States with large amounts of Federally-owned lands. In the State of Idaho, more than 30 minerals designated as strategic or critical have been identified, and 20 of these are currently being produced or have potential commercial production capability. Large amounts of these and other minerals remain to be discovered. Since over 63 percent of Idaho is owned by the Federal government, many of the undiscovered mineral deposits will be located on public lands. Public land-use decisions will, therefore, largely determine the future of the State's mineral industry. Similar circumstances exist in the State of Nevada. This initiative is a cooperative undertaking with the US Geological Survey, the State geological surveys, and the State universities.

ALASKAN STRATEGIC AND CRITICAL MINERALS

The State of Alaska has the highest potential for undiscovered deposits of critical and strategic minerals in North America. Work by both the U.S. Geological Survey and the Bureau of Mines has identified the presence of cobalt, chromium, manganese, platinum-group metals and many other strategic minerals.

The Bureau's work focuses specifically on strategic minerals in order to identify favorable mineralization of strategic and critical minerals, provide the basis for technology to recover minerals in an economic and environmentally safe manner, and provide information for informed land use decisions. Resource identification and assessment is carried out cooperatively with the USGS and the ADGGS.

Alaska poses unique problems for mineral recovery. The Arctic conditions, remote location, and environmental concerns all add costs to the point that without new technology, mineral recovery would be uneconomic. Research in the basic program that addressed problems posed by the extraction from Alaskan resources includes characterization, mining technology for deep placers, and bioextraction. Environmental protection is addressed in all phases of this effort. However, specific studies are planned to eliminate or reclaim waste disposal areas and to obtain data on long-term migration of contaminants.

These efforts will provide the scientific basis for technology to stimulate private sector development of Alaskan mineral resources and mineral data and economic analyses on which to base land-use decisions, leading to positive impacts on the Alaskan economy in the form of more jobs, increased revenues, and infrastructure development and on the Nation's supply of several strategic and critical mineral commodities.

MANDATORY COST INCREASES

The Bureau requested what was expected to be a one-time cost of \$3.0 million in FY 1989 as a result of a Superfund-related settlement negotiated with the Robinson Brick Company (ROBCO) of Denver, Colorado to reimburse the EPA for cleaning up radioactive wastes generated seventy years ago by activities of the Bureau of Mines, under an agreement with the National Radium Institute, a now-defunct private organization, on the Robinson site. The EPA has begun work to clean up this site, and has found that contaminants have percolated through the soils, thereby producing much larger quantities of contaminated materials than had been originally estimated. EPA's estimated costs for cleaning up the site, not including final disposal of the contaminated materials, have reached \$13.5 million. Additional excavations and costs are anticipated. An increase of \$7.5 million is therefore required in FY 1990 if the Bureau is to honor its commitment to provide funding for these efforts.

Mr. Chairman, that concludes my prepared statement. I shall be happy to respond to any questions that you or your committee may have.

Mr. VALENTINE. Can you talk to us briefly about the plans which you have for the Bureau in research? What do you expect the contribution to be of the Bureau of Mines over the next fiscal year in making a contribution to an increase in our national knowledge with respect to minerals, and to what extent is that function carried on in the agency or in the colleges that receive grants?

Mr. ARY. If I might broaden that just a little to start with, I have requested the Bureau to prepare a budget, an unconstrained budget—say without any restraints, where would you want to go—so that I can try to open up the entire activities of the Bureau and ~~to take a look at each one of the projects that we are working on to~~ find out if there are any projects there that we should drop or if there are areas where we are not fully utilized so that we can look at new projects.

I have also asked our group to look at a multi-year budget. It is difficult for me, coming out of industry, to see how the Bureau or any government agency can operate a research program on a year-to-year budget. Research projects are just not that short, and so I have asked to take a little longer look and see where we ought to go and maybe look at a two-year budget and then also a five and a 10-year program.

That is the type of budget that we would be bringing out.

The particular one we have here of course covers the one year, and I expect that we will continue our work on the research side with respect to the health and safety aspects, environmental regulatory locks, environmental technology, and also to look at the advanced materials side and continue our information gathering and our research work in trying to find out how we can utilize this.

Mr. VALENTINE. What was the response of the OMB to that request to do the two-year budget?

Mr. ARY. They indicated that the government budgets on a one-year basis and that we are looking at the 1990 budget and did not encourage me to go further.

This year we are going to go back again and try the same approach, but they have indicated that the way the government operates is on a year-to-year appropriation.

Mr. VALENTINE. Did they say anything to you about precedents?

Mr. ARY. I don't think so because at about that stage of the game I don't think I was listening too much, Tim, because I was a little more irritated than I probably should have been, and I was probably saying some things that I probably should not have at that stage of the game.

Mr. VALENTINE. To the extent that you haven't done it in answer to that question, could you list for us your own priorities for the Bureau?

Mr. ARY. Over and above what I have? Because my budget is the basis that I had prioritized what I wanted, and I think that what I came out with—there were several projects, of course, that I would have liked to have had, had we not been restrained by the deficit, and so forth.

But we have two parts of our operation, our research and our information and analysis. On the research side the activities that we were looking for first, in my eyes, were those things where we can increase the safety and the health arrangements and at the same

time look at increased activity operations.

So we were looking at items we can actually increase the well as moving the miner out of the mine and having him off to the equipment.

This is the type of program that particular side. We have done a lot of work on the dust side in coal. I am trying to find out if there is a way other than increasing the dust load, and to try to find out is there a way to break that coal and the other rock without creating a lot of the dust.

We have done some work on pieces of equipment that we think will do this, and we are now trying to encourage industry to pick it up. We have got it past the point of demonstration area, and we have a lot of real research. We need a demonstration company that is coming in to sponsor the cost of that, and we are trying to get those things out.

Mr. VALENTINE. Do you have an opinion that you would care to share with us as to why the Bureau's research budget receives such low consideration by OMB in comparison with other research programs within the Department of Interior and other agencies?

Mr. ARY. I am not sure I can really say why because I have not—I am trying to figure out how to say this—I haven't had that kind of exposure to OMB, enough of it yet. If I may step back and say from my industry experience, I was concerned for quite a while about what was happening to the Bureau because I saw a reduction in the budget over the years down to the point where we almost didn't have a Bureau and also saw a reduction in personnel, and I was concerned about where the Bureau was going, and as a matter of fact, it was due to that that I was very hesitant to even consider accepting the job as the Director.

So I had the feeling that something was happening that the Bureau was not receiving its just dues. I agreed to come in with an industry background and to say what I thought about it, and I did.

I explained to the Secretary and others that I felt that the industry needed the help of the Bureau. The Bureau was important in a lot of ways and that I felt that they should reconsider the role that they felt the Bureau ought to play.

Now, I have a good feeling for the Bureau and what they ought to be doing, and the people are good. We have outstanding scientists. We have some of the finest in the world, and it was odd to me that our foreign competitors were coming in here and gathering the information from the Bureau and taking it overseas and killing us with it. They were out competing, and we couldn't seem to get people in the United States to recognize what good work the Bureau was doing.

Since I have been here, I have been saying that as often as I can to as many people as will listen, and I think maybe they are starting to hear it.

I think I got pretty good support on the hearings for my last budget at the Department. We went back after they kicked it back

and increased competitiveness of the

like automation and robotics, where competitiveness of the operation, as from under the dangerous area of the side with remote control operating

that I was interested in mainly on doing a lot of work on the dust side in that a way other than increasing the dust load, and to break that coal and the other rock

pieces of equipment that we think ing to encourage industry to pick it up. We have got it past the point of demonstration area, and we have a lot of real research. We need a demonstration company that is coming in to sponsor the cost of that, and we are trying to get those things out.

an opinion that you would care to share with us as to why the Bureau's research budget receives such low consideration by OMB in comparison with other research programs within the Department of Interior and other agencies?

really say why because I have not—I say this—I haven't had that kind of exposure to OMB, enough of it yet. If I may step back and say from my industry experience, I was concerned for quite a while about what was happening to the Bureau because I saw a reduction in the budget over the years down to the point where we almost didn't have a Bureau and also saw a reduction in personnel, and I was concerned about where the Bureau was going, and as a matter of fact, it was due to that that I was very hesitant to even consider accepting the job as the Director.

something was happening that the Bureau was not receiving its just dues. I agreed to come in with an industry background and to say what I thought about it, and I did.

and others that I felt that the industry needed the help of the Bureau. The Bureau was important in a lot of ways and that I felt that they should reconsider the role that they felt the Bureau ought to play.

the Bureau and what they ought to be doing, and the people are good. We have outstanding scientists in the world, and it was odd to me that our foreign competitors were coming in here and gathering the information from the Bureau and taking it overseas and killing us with it. They were out competing, and we couldn't seem to get people in the United States to recognize what good work the Bureau was doing.

been saying that as often as I can to as many people as will listen, and I think maybe they are starting to hear it.

support on the hearings for my last budget at the Department. We went back after they kicked it back

to us, and we told them, well, there are certain things in here we ought to be doing, and the Department bought off on that, and we submitted it in to OMB, and—of course the overall constraints of the Administration—the OMB saw fit to cut some of these programs out, but they, too, recognized that there were a couple of programs that they felt should be left in, and so we did a little better than what I thought we would from what I had heard.

I am back knocking on the door again with some of these programs, and I will continue to try to sell them.

We have a need to go out and do land assessments, which are very, very important, and before we start withdrawing land and start to withdraw large areas of land like we have in Alaska, we need to know what is there, and in Alaska—it is already withdrawn, but there are ore bodies there that we know about, and we are trying to get the necessary funds to go look at that so that we can get people interested in that.

In our research work we are starting to do things on reclamation that have not been really done before. I think they are kind of revolutionary, where we are trying to use bugs to go out and reclaim acid from mine drainage.

And so I think that the OMB is—I think they are recognizing. We have yelled at each other several times to get each other's attention. We are now talking to each other instead of yelling, and I think maybe if we can keep that up and keep the discussion going we might win a few more dollars in programs that are very worthwhile, and so I am hoping that that is what we are going to be able to do.

Mr. VALENTINE. You mentioned a use that some of our overseas competitors have made of, if I understood you correctly, research methods developed—procedures developed by this Bureau.

How do you get what you have accomplished across to the American public, to business? What vehicle do you utilize to tell those who might be interested what has been accomplished by the Bureau?

Mr. ARY. In the last few years we have had an accelerated approach on what we refer to as technology transfer, but the Bureau started in 1972 and decided there were a lot of things on the shelf that they had done that were not being used by industry and they ought to get this word out, and so they started in 1972 an organization to get the word out, and as a result we now have a separate division within the Bureau that does nothing but to go out and try to sell the technology or to convince the industry of technology that we are developing or have developed or are in the process of working on that they should use.

We have been very fortunate in getting word out early so that we don't have to carry it all the way, and they come in and they cost share some of this and we do cooperative work, and so as a result we can back away from a project sooner than what we had in the past, let the industry carry forth the demonstration part of it and the pilot work on it and to get it into production, and so our technology transfer group have been very active.

Mr. VALENTINE. How much do you spend on that program, approximately?

Mr. ARY. Does anybody know?

He said the way it is, is it is spread out among each of the agencies and we would have to go back and dig it out. We can make that available for the record.

Mr. VALENTINE. If you would send us something on that, it would be very helpful.

Mr. ARY. Yes.

[Information to be furnished follows:]

INSERT ON TECHNOLOGY TRANSFER EXPENDITURES - PAGE 16 OF TRANSCRIPT

QUESTION: How much is the Bureau of Mines spending on Technology Transfer?

ANSWER: The Bureau of Mines conducts a proactive Technology Transfer program covering a broad spectrum of activities that strives to ensure the successful transfer of new minerals information and research results. "Technology Transfer" includes a wide range of activity relative to the information/research cycle. What is included as costs associated with technology transfer is often difficult to define. For example, it is difficult to define where research costs end and technology transfer costs begin.

Despite this difficulty, expenditures for technology transfer are estimated to be \$2,270,000. Costs included in this estimate are those associated with the Office of Technology Transfer (including exhibits, seminars, briefings, special publications, patent processing and licenses, associated salaries and travel expenses, etc.); salary and expenses of field center personnel assigned as field technology transfer officers; costs associated with the preparation and presentation by researchers of research results for presentation at conferences, etc.; and expenses associated with the printing and reproduction of information and research reports.

Mr. ARY. We have had very good response from this. We try and will from here on out present a half a day of technology transfer at conventions, at seminars, so that if we are at a particular area in metallurgy we will have—the things that we have we are going to present these before a convention starts. They are happy because it draws the people a little earlier. We are happier because we get to know the people that need work done, or they know what we have, and it has helped us in the guidance and in our planning because we are now starting to be with the people that need the work done. Rather than for us thinking up the ideas that we think they need, we are now talking to the people, as they say, you know, that is great, but here is what we need.

So we are getting a lot of input into our programs now.

Mr. VALENTINE. But in addition to this so-called technology transfer efforts, you have a repository. You have the Bureau archives. You have the same place that American business could go to look that I assume the Japanese have gone, don't you? That is there for them, but what I understood you to say is that maybe—you didn't mention any names—but perhaps the Japanese or the Germans might be more inquisitive or more aggressive or more enterprising and they would come and say, look, let us look at your records?

Mr. ARY. I think that—I don't mind mentioning—the Japanese, the Germans, the Yugoslavs, the Russians, the Chinese. We have memorandums of understanding with these people, agreements where we go out and jointly work on projects. We try to transfer some of our technical ideas to them. We in the process pull back what we can from them and gather the mineral intelligence information that we need in kind of a swap for our technology.

But I think from what I have seen—I am speaking now from my industry hat—what I have seen is that they are more aggressive. They recognize that the U.S. is a competitive place to work, and they have ideas of gaining a position in that mining world, and so they see ideas that we have, they come in and get them, and they are a little more aggressive in gathering the ideas.

But they also have sometimes a different concept in their country relative to how they do this. They may get government support and subsidy in order to get this into operation; whereas, our companies are a little slower to adopt an experimental piece of equipment until the bugs have really been worked out of it all the way. And so they are a little slower to adopt our program.

That is why we have encouraged them to come in and participate with us in some of the later stages of our exploration and research work so that they can see this idea develop, and then they will get into it ahead of the foreigners because they will have a participation in it and will be working on the piloting and will have adopted it earlier than if they allow it to be completely open to the rest of the world.

Mr. VALENTINE. Do you have the same type of agreement with the Japanese, for example? Is that on the list of people that you cooperate with? Could American business go to the Japanese Bureau of Mines, for example, and have access to their research?

Mr. ARY. The answer is yes, if you are involved in a joint venture with a foreign company. Then that material becomes available. But

a lot of us—a lot of the—“us” is a bad word for me, and “we” because I don’t know when to take off my industry hat and put my Bureau hat on—but the industry in the U.S. is reluctant to go overseas to look at very many foreign governments’ research work because it is not of the quality that they can get in the U.S. and from the Bureau.

Now, there are some countries that have certain things that, yes, they are ahead of us. They have been doing it longer. We go and try to glean this information as a Bureau.

Mr. VALENTINE. But wouldn’t they have to look at it first before they would know whether it was inferior?

Mr. ARY. Well, it is just a matter of experience. Until recently, they had absolutely no research and we all know in the industry who does what well and we kind of follow it. If they build a better bulldozer than we can, we know about it before the thing gets on the market, and we will go.

But most of the time the leading, the cutting edge of the mining technology is right here in the Bureau of Mines, and so a lot of people come in here.

Now, the Swedes built a different kind of a drill steel and a different kind of drill bit in the early ’50s, and the American companies flocked right over there, and we found out what they were doing and we bought a lot of it. We use it in our mines.

But then we started looking at it and we found that with different technologies that we had we could make a better bit than what the Swedes were using, or we could make a better steel than what they were using, and so as a result we jumped ahead.

And this is the kind of leap frog game we play with those that are good. Now, those that are not as good the industry doesn’t go bother them.

Mr. VALENTINE. Well, I want to go on to some other things we have got here. That is very interesting.

Let me say this. I didn’t ask those questions to try to—I want to be sure that you understood the reason for it. I wanted to find out whether or not this is another area where we had an open source of information which was available to our overseas trading partners just as if they read it in the newspaper, and if we were, as seems to be the case in many situations, making everything that we knew, that we have learned available to them, but when we try to go and find out what they are doing we run into all kinds of real or contrived discouragements, and so on.

But if you have any other thoughts, it would be of interest. Maybe we could talk about it privately sometime. It just concerns me, as I am sure it does so many members of this institution.

I just left right down the hall a meeting on the development of the new television technology, and it just seems that we continue to lead in research but when it comes to translating research into something that can be sold that somebody else eats our lunch.

Mr. ARY. May I make just one statement?

We are involved in an international competition and competitiveness for minerals and for most other things, and with the information distribution that we have it is almost impossible any more to maintain an invention or a discovery close tight so that you can get

much of an advantage because all they have to do is buy a piece of the equipment and take it over and redo it for themselves.

So we are involved in this on an international basis, but many is the time I have heard people say that the U.S. spawns many Nobel winners and the foreign companies grab the market, and I think this is true. We are trying awfully hard to get our industry—and I think we are seeing them do it now after they started this recovery—they are coming in and joining us early so that they can work and get a little bit of a head start by utilizing this equipment and the ideas a little before it gets spread around the world.

Mr. VALENTINE. If the Congress in its infinite wisdom were to restore the money to the budget at the 1989 appropriated levels, can you tell us briefly what you would do with it? Where would you put it?

Mr. ARY. Yes, I can. As a matter of fact, I had that asked me by Mr. Byrd, and I decided that if I was going to be asked that again I was going to have a list, and we have several items that are an absolute must, and one is we have our headquarters relocation, which we are going to be forced to move.

So that is going to be the number one item, and the second item is we have our operations in Denver with our computer, which is in the process of changing, and so that is the second top priority item we have.

And then we are interested in trying to accelerate the biotechnology concept for waste management and recovery and for hazardous waste and the Superfund area, and this is an area that we do plan on additional work on.

And we have a human resources program in our Twin Cities location, in which we are trying to make sure that we get our word across to the people that are using it and trying to find out how can we prohibit or prevent or slow up the working fatigue that comes by doing certain types of jobs, by the way that the equipment is manufactured, how you sit in it or stand up or lay down, and so we are trying to do a lot in that area.

Then of course we spoke about technology transfer. We are going to continue with that, and I would be more than glad to supply you with this list because I could go on.

One of the big items is we are very concerned about the land assessment program in Alaska because we know there are ore bodies there—the new Red Dog ore body as a result of our activity there. It just happened that it was on Indian land and native claims land, and so the companies were able to follow up on a discovery made.

We have made a recent one in Valdez Creek, and so what we are trying to do is define those areas where we know that we have a platinum group and chrome metals and strategic and critical materials, to get this into the hands of the land management agencies to try to get some boundary changes so that we can make this available for our industry.

But I would be more than glad to supply you with what I have called my wish list.

[The information referred to follows:]

Director's Priority List - Unfunded Needs
(\$ in millions)

Item	Cost	Cumulative Cost
1. a F&M - Headquarters Relocation		
b F&M - Minicomputer and Software	\$1.50	
	0.55	\$2.05
2. a ET/MMS - Accelerate Biotechnology		
b ET - Waste Management and Recovery	3.50	5.55
c ET - Hazardous Waste	0.50	6.05
	2.00	8.05
3. a HS&MT - Human Resources		
b Research - Technology Transfer	4.00	12.05
c HS&MT - Emergency and Recovery	2.60	14.60
d HS&MT - Selective Mining	1.90	16.55
e I&A - Regulatory Issues	2.00	18.55
f I&A - Systems Improvement	0.28	18.83
g HS&MT - Subsidence and Super Longwall	1.00	19.83
	3.00	22.83
4. a I&A - Alaskan SCM Initiative		
b HS&MT - Alaskan SCM Initiative	1.50	24.33
c MMS - Alaskan SCM Initiative	1.20	25.53
d ET - Alaskan SCM Initiative	0.40	25.93
	0.40	26.33

F&M - Finance and Management
ET - Environmental Technology
MMS - Minerals and Materials Science
HS&MT - Health, Safety and Mining Technology
I&A - Information and Analysis

Mr. VALENTINE. In your testimony you state that—in the written testimony—the Mineral Institute program “is no longer an appropriate use of federal funds.”

If this is the feeling, why was money originally requested for that program, and can you tell us why the Department cut the request?

Mr. ARY. The Mineral Institute program was initiated to provide funds to encourage continued research and education opportunities in the mineral industry.

Before my time, the decision was made that the Department would not fund it, and here again it was because of the fact that it ~~was not high enough on the priority list to make the cut.~~

I have testified before I came to the Bureau and it has been my past experience that I felt mineral institutes were good and a generic center activity was good, and I encouraged the Bureau and the Department in those days to fund it.

It is hard to change my personal attitude, although I am wearing the hat of the Administration and I feel obligated to stand behind their position on this.

However, last year I did request that our people budget for it and we took it through the Department and through the course of the budget process we were not successful in getting this agreed to for the budget. It was appropriated by Congress again.

This year I have talked to our people and have said the same thing. We will review it, we will budget for it, and we will again scrape to see if we can't convince some people of the way we feel.

There are a lot of good things come out of it. We have a good advisory committee. We are getting good input from them, not only on the Mineral Institute side of it, but we are getting good ideas from them in where our other programs should go.

So we are learning a lot from the institute program. Their advisory committees have been working well, and I don't know how I am going to make out this year. Time will tell.

Mr. VALENTINE. The American Mining Congress has suggested that the appropriation even be doubled, as I understand.

Would you care to comment on that?

Mr. ARY. Well, I almost hate to because several years I testified on behalf of the Mining Congress on this subject, and at that time I had made the recommendation that it be at least doubled.

So sitting here now, if—I don't know what is going to come out of our budget program, but if we were successful in getting our budget through on the institutes, I have explained to the Department that I feel that we might be able to have a little more input into the guidance of the program and we will get a little better bang for our buck.

And that is what I hope I can keep hammering at, so that we can get some support and we can do it.

If we do not get that support, then I will not have as much input in the direction of the programs as I would like to have.

Now, the institutes may not be as happy with me if I had more input into where the programs ought to go. They might be happier the way it is, but so far I haven't found that. They are very receptive to ideas, to help and guidance, and they have been very helpful to us in their submittal of information and ideas to us.

We have gained a lot because our advisory committees sit with the generic centers, and we can see some of the things that they are doing on a scale, a smaller scale than what we are, but the ideas that they are generating are coming into our lab then and we are saying, look, you know, boy, that will fit right into this program and then we can use it.

Mr. VALENTINE. Does the Bureau plan to close or consolidate any more lab facilities?

Mr. ARY. I sure hope not. I got in on the tail end of the Avondale closure and I hope that I'm not a party to that. We have looked awfully hard and I have asked a lot of questions about the organization of our centers, and as long as we can maintain a program and have program money, I don't anticipate reorganizing or closing anything.

Mr. VALENTINE. All right, sir.

I tried to dig up some more questions for you from the Republican side, but I'm told that they don't have any questions. We thank you very much.

Mr. ARY. Thank you so much.

Mr. VALENTINE. Our next—last witness is Mr. Robert R. Beebe, Senior Vice President, Homestake Mining Company, Incorporated, representing the American Mining Congress.

We're glad to have you here, sir.

Mr. BEEBE. Thank you.

Mr. VALENTINE. Your prepared statement will appear in the record and feel free to summarize it or proceed otherwise as you deem appropriate.

**STATEMENT OF ROBERT R. BEEBE, SENIOR VICE PRESIDENT,
HOMESTAKE MINING COMPANY, INCORPORATED, REPRESENT-
ING THE AMERICAN MINING CONGRESS**

Mr. BEEBE. Thank you.

It was prepared by the Mining Congress and some excellent staff work went into it. I'm glad that it's going to be incorporated into the record, but parts of it I will touch on only lightly.

I do think though that it's worthwhile to say that the Mining Congress is the most broadly-based of the country's mining industry trade associations. It has about 450 members that represent a very broad spectrum of the mining industry and the industries that supply it with goods and services and financial assistance.

It's been an association that for many years has supported the work of the Bureau of Mines and has appeared before this Subcommittee and other committees on many, many occasions.

We're especially pleased, speaking for the Mining Congress, to be able to say that we have followed and encouraged the changes that have been taking place in the Bureau of Mines, both under Director Ary and under Mr. Brown, who was his immediate predecessor. And I have been personally involved in some of these things and can see and appreciate these changes. And by the way, we're delighted to see that Mr. Ary is going to be carried over.

There are four areas in the testimony that's been prepared that we want to be sure to touch upon, one is the subject that you've

already devoted some time to, the Mining and Mineral Resources Research Institutes.

Another is an example of the Bureau's use as a scientific organization capable of doing resource analysis in support of policy decisions; this particular one has to do with the California Desert Conservation Area.

The third one is to present the Mining Congress' views on mineral policy, including Federal coordination, and this of course bears on the Bureau because we see the Bureau as being the focal point for that kind of activity here in Washington.

And the fourth thing, while it doesn't directly involve the Bureau, that we wanted to bring up is the fact that the Mining Congress itself, in recognition of the fact that the industry has to bring something to the party; has recently set about forming an organization within the Mining Congress, a committee of the Mining Congress Board, to help to identify and solve the mining industry's technology needs.

And we have had the strong assistance of the Bureau in putting that effort together and we anticipate that we will be working closely with the Bureau as it goes forward.

This is an important point not only because of the Bureau's involvement, but that we see the desirability, in fact, the necessity of being able to come before bodies like this and even OMB, whether in company with the Bureau or separately, and say that the Bureau does indeed have industry partners who are interested in its welfare and who believe that its mission serves a national purpose.

The Mining Congress supports the appropriation, as you noted, for the State Mining and Mineral Resources Research Institutes, and indeed recommends that this be expanded. This expansion is not up to the level that is actually authorized but is nevertheless, as you noted, something like twice as much as the appropriation was in the preceding year.

Our industries have suffered a recession in the early and middle-Eighties that had, among other effects, the literal decimation of the industry's internal research and development capability. This was coupled with a period through the same years when the Bureau was actually in decline when there seemed to be an effort to present an argument that perhaps we didn't need a Bureau of Mines, indeed, that the mining industry might be something of a dying industry.

Throughout this, the foresight that was shown in continuing these appropriations resulted in the Mineral Institute program being a sort of lifeline, particularly some of the smaller institutions, or large institutions which had only a small part of their total facility devoted to mining-related curriculum.

There are 32 of these institutions that receive funds under the allotment program, and at the present time each institution receives around \$140,000. This is not a trivial sum, but it's small enough that it literally can only be used for scholarship support and perhaps the support of a professor's salary or something of that kind. It keeps the body functioning, but it doesn't allow for much growth beyond that.

And one of the things that we're running into is the increasing difficulty of holding good faculty in these disciplines when they see opportunities to pursue scientific research in other fields where they get more professional recognition and so forth. And the accrediting associations see the same thing, they say if you don't have a certain limited number of faculty devoted to this field we won't accredit the field. And finally, down the road, the regents and the legislatures in the individual states say well if you can't get Federal support and you can't get accreditation, why should we continue to fund?

We see this as being a very dangerous thing for the mining industry because these institutions, like the Bureau, provide us with the scientific research that underlies whatever technical developments we will need to remain competitive in the future.

But beyond that, they do something that the Bureau can't do: they provide us with the manpower that we need to continue as a viable industry. There is no substitute for that.

Mr. VALENTINE. Let me ask you a question, if you'd just put your finger right there:

It's my information that approximately, or at least 105 mining engineers—or let me put it differently—that only 105 mining engineers are expected to graduate this year.

Mr. BEEBE. Yes, sir.

Mr. VALENTINE. And I know that statistic is disturbing to you. Has the AMC or the industry done anything that you know of in an organized way to encourage students to enter this field or to bring students in?

Mr. BEEBE. Yes, sir, the industry has and the AMC has—I say the industry in terms of individual companies and AMC, of course, as an industry-wide body. The encouragement has taken the form largely of making information available about these careers and trying to stimulate interest at a variety of levels.

It has met with some success, but not enough, we're not flooded with applicants. And in some cases the institutions on which we depend are, and always have been, quite small. And in many cases they were specialized institutions that date back to the very early days. They're like the land grant colleges; in fact, some of them are parts of the land grant colleges.

And for that reason we've become extraordinarily dependent upon some of these for manpower. Their faculties have declined, and in some cases have declined to the point where even those of us in the industry would like to be able to do something to improve the quality of these faculties and improve the quality of the education. There's time and perhaps time past for some curricular reforms and so forth, but again we find ourselves in the position of having to stop the bleeding before we can do much restorative surgery.

Mr. VALENTINE. Do you think that there is more that the Bureau could do?

Mr. BEEBE. The Bureau is doing an excellent job with what they have and their attitude, as it's been exemplified in the last couple of years particularly, indicates to us that they will do even more, not just as a function of the resources that they are given, but their attitude is much different than it had been.

The Bureau, quite frankly, was a pretty insular organization some years ago, quite satisfied to do its own thing within its own boundaries and treat the rest of the world as something outside of the Bureau's area of interest and responsibility. We see this as having changed and we think it's very significant.

Your remark about the industry and what the industry can do, in just a moment I'd like to make some remarks about what the Mining Congress is doing in that regard.

But as the prepared testimony indicates, the Mining Congress is suggesting that the appropriation for the Mineral Institute program be set at at the very least \$16,650,000 is the figure, of which \$7.2 million would be appropriated for the allotment grant program. This would have the effect of making it possible to increase the grants to individual institutions under that program to \$225,000 and the testimony makes note of the fact that that is the level at which this program stood ten years ago adjusted for inflation.

The California desert story we brought up because we think it provides a good instance of having the Bureau as a source of scientific support for the Congress and for the country as a whole. We think this is an essential part of the Bureau's activities and one which deserves support and even expansion. We need somebody like the Bureau who can come forward with facts and figures when difficult questions of these kinds come up.

The California desert, of course, is a major producer of many of the mineral elements used in extremely critical applications, and the Bureau's work pointed that out.

I should mention, by the way, the Bureau worked in concert with the Geological Survey on this particular problem, in pointing out that 97 percent of the country's rare earth production comes from the California desert area, and these are such things as are used in superconductors in computer applications and X-ray tubes, magnets, alloys, lasers, so on and so on and so on. Many applications are listed in the testimony.

The desert is also, and the Bureau pointed this out, the largest producer of boron compounds in the world and the United States is a very important and strong exporter of boron compounds. It's a source of some satisfaction that this is one mineral industry that's very healthy and very competitive on a world basis, but it is seated in the California desert because that's where the resource is.

Furthermore there are such prosaic things as sand and gravel industries in the California desert which support the very large populations along the coast. People tend to forget about these things and their importance, but the Bureau work did draw this out very nicely.

So in summarizing the work that they did, they were able to analyze these in a very professional way, these California desert resources, and produce the analytical data that were essential for the use of decision-makers in government in balancing environmental protection and mineral development needs for the general economy. And we believe the Bureau should be recognized and utilized in this role more widely.

The prepared testimony includes some remarks on the Mining Congress' view of mineral policy, and it recites the history of legis-

lation that has attempted to define mineral policies and coordinate Federal activities.

There certainly has been no lack of these things—and since the testimony details them I won't go into them, except to say that there have been many, many studies and reports and while all of them have acknowledged the national significance of an adequate mineral supply and the importance of a strong domestic mining industry, we have unfortunately repeatedly encountered the type of thing that you referred to earlier in talking with Director Ary: we found that there is this attitude of Well if not dead, mining is dying and we shouldn't go out of our way to support a dying industry.

As a matter of fact I'm involved in one of these studies now that's being run by the National Materials Advisory Board that was asked for by the Bureau, by the Department of Interior, and we naturally are hoping that this will have something of a better effect.

But whatever has happened, the Mining and Minerals Policy Act of 1970 has not been effective, it didn't achieve the purposes and objectives for which it was intended. It was followed up by a similar Act in 1980, the Materials and Minerals Policy, Research and Development Act, which this Committee I believe played a major role in formulating, and that didn't seem to be working either. So the Congress in 1984 enacted the National Critical Materials Act, again under the leadership of this Committee.

And the Mining Congress, by the way, was a vigorous supporter of this legislation and, in particular, of its provision for creating a three-member National Critical Materials Council.

Unfortunately we have to say that the primary responsibilities of the Council have been delegated or assumed by other Federal Government entities and there has been absolutely no effort to implement the will of Congress as expressed in this legislation.

Mr. VALENTINE. Let me ask you right there, please, sir: Has the AMC made its position on this Council known to the Bush Administration?

Mr. BEEBE. Yes, sir, frequently.

Mr. VALENTINE. And can you tell us anything about how you have done that, to whom have you spoken?

Mr. BEEBE. I've got the experts here, but I'd have to refer to Mr. Knoblock for a specific answer.

Mr. VALENTINE. If he could give us that we would like very much to have it if it wouldn't—

Mr. BEEBE. I think that that will be forthcoming from the Mining Congress, yes, sir.

As you may know, now the Critical Materials Council exists but in a very strange way, it's been parceled out, it's last director, I understand, recently left to become a member of the professional staff of the Bureau of Mines, by the way, Mr. Brown.

And it's something which at the very least deserves study to see why it can't be followed up and why it can't be given a good faith opportunity to carry out the work for which it was originally intended. It hasn't been and it may be a necessary step, because as long as something like this exists at least on paper, there may be those who will take refuge in that and say well we don't really

need anything more because we've done that already but the fact is that this hasn't really resulted in any meaningful change.

Mr. VALENTINE. Do you feel that the AMC and/or other industry groups could do more to focus attention on the need for the Council and—

Mr. BEEBE. Yes, sir. That leads me to—in answering that, to the last part of our presentation, in that that's related to the fact that one of the Bureau's major functions is research and in deciding that the Mining Congress should become more involved as an organization, the then-chairman of the Mining Congress who happened to be my boss, Harry Conger, who's Chairman of Homestake, brought the Bureau in very early for consultation because we not only didn't want to hurt the Bureau by making it seem that we could do without them but we wanted to be sure that we had involved them and gotten everything from them that we could get in the way of benefit and participation.

And AMC, as a result of this self-examination, I might call it, has now initiated a program to identify and solve the mining industry's technology needs and help to communicate them, not only to the Bureau but the third leg on this stool after industry and the Bureau is the colleges and universities that deal with these curricula.

For some time we in the industry have had a growing sense that our research capability was fragmented and we were losing focus and pertinence to it. We felt that there was a need to develop ways to bring this back together.

I mentioned earlier that the industry had suffered very greatly during the recession, and rather than try to re-generate what was lost—in fact what may have been lost over a much longer period of time was its competence as well as its very existence—cooperative research involving the Bureau, the industry and the universities is probably the way to go in the future. And we do have need to develop these and to coordinate our activities and to create a long-range process and plan for mining-related research.

I was very sympathetic to Director Ary's remarks about his efforts to have a 10-or 15-year plan. It's frustrating that he can't have a budget for that, but I don't see why he can't have a plan for that. And I think that it's necessary and desirable that he have a plan for that.

But as an industry it's necessary that we have a plan also and furthermore that we're so concerned about the diminishment of our pool of manpower replacements that we need in this industry and the loss of our research capabilities that lead to the technological changes we will have to have to be competitive, that we've got to involve the colleges and universities in this. So it's a closed loop. Each of these entities has to look to the other.

The Bureau of Mines research budget for FY89 was something like \$91 million and involved about 1250 people. In addition to this, the Federal laboratories are spending—it's variously estimated, the figure I have here on the piece of paper is \$18 billion a year. And some of this is mining related, a surprising amount of it has to do with the preparation of underground structures and things of that kind and other things that, while they may seem very exotic to

someone who's not involved in the mining industry, they may work on things that we're very interested in.

We need a sharper focus by the industry on these things. We need better information about what's going on and how we can tap into and utilize these kinds of things. And frankly we see the Bureau as playing a role in helping us to be better informed.

But for our own part, to try to accomplish our own goals, at the beginning of this year AMC has carried out the following actions:

They've set up this Board committee that I mentioned and given it instructions to identify the technological priorities of the various segments of the mining industry to monitor and advocate the funding of mining research by Federal and state governments, as well as by academic and other private sector institutions that can help us with these problems.

On a long-term basis, to consider whether AMC member companies could benefit from jointly-sponsored research, with or without government support, and finally to alert AMC member companies about research underway and the results of that research—here again it's easy for us to be critical of the fact that some of the industries have themselves greatly cut their research and development budgets.

But rather than criticize entirely, to try to first get them to recognize that there is a need and to draw them together in recognition of that need. But that may lead to their own decisions to cooperate with the universities, with the Bureau, to join industry groupings and so forth. We now have legislation that makes it more possible to do this, where before we might have had to fear for Anti-trust violation.

So all of these things have now gotten the support of the industry's leadership, as represented by the Board of Directors of the Mining Congress. This has just happened, we don't have any details yet to report, but by the time the Mining Congress comes before you next year I hope we will have this information.

Now I'd be happy to try and answer any questions you might have.

[The prepared statement of Mr. Beebe follows.]



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Statement
of
Robert R. (Ray) Beebe
Senior Vice President
Homestake Mining Company
on behalf of the
American Mining Congress
presented to
The Subcommittee on Transportation,
Aviation and Materials
Committee on Science, Space and Technology
U.S. House of Representatives
Authorization and Oversight Hearing
on
Proposed FY 1990 Budget for the
Bureau of Mines
March 21, 1989

Good morning. My name is Ray Beebe and I am Senior Vice President of Homestake Mining Company, the corporate headquarters of which are based in San Francisco. I have also recently been chairman of an American Mining Congress (AMC) Ad Hoc Group on Technology Needs, and it is a pleasure to be here this afternoon to testify before the Subcommittee about the activities of the Bureau of Mines.

AMC is an industry association of approximately 450 companies that encompasses (1) producers of most of America's metals, coal, and industrial and agricultural minerals; (2) manufacturers of mining and mineral processing machinery, equipment and supplies; and (3) engineering and consulting firms and financial institutions that serve the mining industry.

As the nation's major broadly based mining industry trade association, we strongly support the Bureau of Mines and its programs. We are especially pleased that in the past several years the Bureau has been revitalized and is positioning itself to better perform its role as the lead agency in the Executive Branch for mining and mineral research, information and analysis.

Today, I would like to address four areas: (1) the Mining and Mineral Resources Research Institutes Program; (2) the Bureau's truly outstanding work on resource analysis in the California Desert Conservation Area, (3) AMC's views on mineral policy, including federal coordination; and (4) a new AMC effort to identify and solve the mining industry's technology needs, with the strong assistance of the Bureau.

Mining and Mineral Resources Research Institutes

The American Mining Congress supports the appropriation of funds for the State Mining and Mineral Resources Research Institutes (MMRRI) Program as reauthorized under Public Law 98-409 and amended by Public Law 100-483. This program, administered by the Bureau, is the only significant federally supported effort in university training and research in extractive mineral technology and, therefore, makes an important contribution to the nation's mining and mineral processing needs. A strong domestic minerals industry is vital to the economic health and long-term security of the United States. The educational and research capability of the extractive mineral programs in U.S. universities, supported by the mineral institutes, is fundamental to maintaining the flow of manpower and technology to the minerals industry.

The recent recession in the domestic minerals industry included a decline in corporate mineral research; thus, the state mineral institutes research program is the only broad-based mineral research support available to universities. The 32 institutes presently involved in the program are an integral part of the universities that provide the principal source of trained technical manpower needed by the industry. The future growth and productivity of the mining and minerals industry may well be

dependent upon the ability of universities to attract students and professors. Through the research programs they carry out, the institutes provide a focus of attention that attracts competent professors, who in turn mold the future managers and technicians by transfer of experience and training.

Public Law 98-409 authorizes an appropriation of \$27,800,000 for the Mineral Institute Program for fiscal year 1990. In recognition of needed budget restraints, we recommend that the appropriation for this program be set at the very least at \$16,650,000. Of this amount, we recommend \$7,200,000 be appropriated for allotment grants to the institutes; \$9,100,000 for research grants; and \$350,000 for program administration. The \$7,200,000 allotment grant request would provide \$225,000 for each institute, restoring the level of funding for the institutes to the level of ten years ago, adjusted for inflation.

In short, the MMRRRI Program has been a lifeline during the hard times from which the mining industry is only now emerging. If the nation's mining and minerals industry is to remain competitive it must be able to attract qualified technical manpower as well as utilize new mining and processing methods and technologies. We urge adequate funding to meet this need and maintain the program at an effective and realistic level.

California Desert Conservation Area

The analytical capacity of the Bureau is essential for the intelligent determination of our national mineral resource needs. For example, the Bureau, which is primarily responsible for helping to ensure adequate, dependable supplies of all nonfuel minerals, played a crucial role in preparing a report with the U.S. Geological Survey on the current knowledge of the mineral resources and mineral resource potential of the California Desert. Bureau statistics indicated that the California Desert Protection Act if enacted could have very serious implications for national security and the competitive position of the United States in the world economy.

The Bureau noted that the California Desert area is a major world producer of many mineral elements used in extremely critical applications. The minerals currently mined in the desert include 97 percent of the nation's rare earths. Rare earth elements are used in superconductor applications, in computers, x-rays, high-density magnets, alloys, lasers, glass communication fibers, electronics and nuclear reactors. Our advanced weapons systems such as lasers for the Strategic Defense Initiative and communications systems on the ground, in ships, and in aircraft that are unaffected by the electromagnetic pulse require one or more of the rare earth elements.

The Bureau report also indicated that the U.S. is the world's largest producer of boron compounds with all U.S. production coming from the California Desert. These compounds are used

in glass, high-temperature ceramics and experimental superconductors. The report noted that the sand and gravel industry is a major employer in the California Desert area. Sand and gravel is used for construction in the southern California region. Specialty clays from the Desert area are used in sewer filtration systems, chemical refinery, ceramics, drill needs and specialized chemical research.

By way of summary, the Bureau's work in analyzing California Desert resources is an excellent example of its capacity to produce analytical data essential for the use of government decision makers in balancing the need for environmental protection and mineral developments.

Mineral Policy

With regard to federal coordination efforts related to basic and advanced materials, there has been no lack of mineral and material policy studies over the years. Several have been issued by both the Legislative and Executive Branches of the federal government and from other sources. All of the studies acknowledge the national significance of an adequate mineral supply and importance of a strong domestic mining industry.

After a dozen years of effort, Congress enacted the Mining and Minerals Policy Act of 1970. The statute clearly established a national value of domestic mineral production. Congress clearly intended that the individual and collective impacts on the mining sector of other national priorities be evaluated completely and carefully in full recognition, both of the importance of mining and the consequence of contemplated federal actions.

The Mining and Minerals Policy Act has failed to fulfill its purpose and objectives. Recognizing that further direction for federal materials and minerals policy was necessary, the Materials and Minerals Policy, Research and Development Act was crafted under the leadership of this Committee and was enacted in 1980.

Through the course of its experience with implementation of the 1970 and 1980 Acts, it became apparent to Congress that no single federal entity in the Executive Branch had the authority for coordinating and analyzing critical materials policy. In 1984, the Congress enacted the National Critical Materials Act, again under the leadership of this Committee. AMC was a vigorous supporter of the legislation and in particular for the provision creating the three-member National Critical Materials Council.

Unfortunately, the primary responsibilities of the Council have been delegated or assumed by other federal government entities. There has been absolutely no effort at all to implement the will of Congress. The Council has not utilized the money authorized by Congress to fully staff it. We believe the Critical Materials Council should be given a good faith opportunity to carry out its mandate. We continue to support a strong and

active Critical Materials Council, but to be effective it must have the authority and means to pursue its mandate.

Technology Needs of the Mining Industry

One of the Bureau's major functions is mining and mineral research. After extensive discussion, AMC has now initiated a program, in cooperation with the Bureau, to identify and solve the mining industry's technology needs.

By way of very brief background, for some time there has been a growing sense of concern among representatives of industry, government and academia that mining research activity is increasingly fragmented, and that there is a need to develop ways to pull together and develop a coordinated, long-range process and plan for mining research. Related to this, is concern about the diminishing supply of engineers graduating from mining schools.

By way of examples of the magnitude of efforts underway, the Bureau of Mines research budget for FY 1989 amounted to \$91 million and involved 1,250 federal employees. In addition, federal laboratories are spending \$18 billion/year on research, an unquantified portion of which is mining related. These funds are substantial; and a sharper focus by the industry on their expenditure is important.

In an effort to accomplish this goal, beginning this year, AMC will carry out the following actions: (1) identify the technology priorities of the various segments of the mining industry; (2) monitor and advocate the funding of mining research by federal and state governments, as well as by academic and other private-sector institutions to address these technology priorities; (3) on a long-term basis, consider whether AMC member companies could benefit from jointly sponsored research, with or without government support; and (4) alert AMC member companies about research underway and the results thereof.

This program has the support of the industry's leadership. It is too early to report further details to the Subcommittee, but by this time next year we hope to have achieved some preliminary goals, and would be pleased if the subcommittee would invite us back to provide you with a progress report.

Thank you. I will be happy to answer any questions.

Mr. VALENTINE. All right, sir. Thank you very much. Would you care to share with us, or would you be in a position to share with the subcommittee, Mr. Beebe, your priority list for the Bureau, what do you think the Bureau should be doing and in what order?

Mr. BEEBE. My personal priority list would of course be heavily directed towards research. I think that—personally I feel that the Bureau has some mix of motives having to do with the various missions that it's called upon to carry out. Director Ary touched mainly on those things that are of specific interest to your Subcommittee, being research and dissemination of information, but as you know the Bureau has a number of regulatory functions and health and safety functions and so forth and of course these are necessary and desirable.

But my personal priorities would have to be that the Bureau be first of all involved in research. I don't see it as being either necessary or desirable that the Bureau be looked upon as the only source of such research, that we're not trying to create some sort of research empire in support of the mining industry, but that a strong Bureau has a very important role to play in these things, that there are things that the Bureau can do that the universities and the mining companies can't, no matter how healthy they are. There are things that the Bureau would do best if they could do them and were able to do them in cooperation with the industry and with the universities. And I think that the present Administration is pushing hard in these directions, at least everything we see is...

My second priority would be the continuation and strengthening of the information functions of the Bureau. I think it's a valuable resource for the Congress, for agencies of the Administrative branch and for the industry. I think it can be improved. Its timeliness certainly can be improved and its coverage in some cases can be improved, but we also now have the kind of Administration in the Bureau that knows what these problems are and is directed towards their solution. So those two areas would be my personal higher priority.

If you wanted to talk about specific efforts, they have to be the sorts of things that will contribute to the competitive stature of the U.S. industry, bearing in mind that man-for-man we are probably always going to have a relatively high personnel cost in our industry because we pay our people more. We're probably always going to have a very high regulatory burden, because of the nature of the laws and regulations under which we operate.

So we will be looking for not just additive or evolutionary technologies that can meet some of the problems that we encounter, but down the road to the sorts of revolutionary technologies that can permit us to gain competitive edges despite our higher cost, despite the fact that the ore deposits that we have within the country are declining in grade and these kinds of problems.

It's well to bear in mind that the United States is not just a major user of mineral commodities—it's still the biggest user of many mineral commodities and among the first three of most—but it's a major producer.

And if the United States were to fail in its production role, we would have a situation which would amount to the self-fulfilling prophecy: great shortages of all sorts of commodities, not just critical commodities but prosaic things like copper, lead and zinc and much higher prices. So a viable mining industry is very important to the country and the Bureau has a big part to play in that.

We don't have—we're the only resource industry that would be left without a focal point in Washington if we lost the Bureau of Mines or if the Bureau of Mines became so weak as to be ineffective.

Mr. VALENTINE. Are we to infer from what you've said that if this list of priorities—that if the Congress were to restore the funding to the Bureau, you think that the extra money should go for the purposes that you have described or would you—

Mr. BEEBE. I wouldn't want to go so far as to say that I could substitute my own judgment for that of Director Ary, because I don't have all of the facts that he has and I'm not aware of all of the priorities that he must meet. So I'd be happy to defer that judgment to him.

But if I were, yes, sir, that's what I would do.

Mr. VALENTINE. Can you share with us an insight as to why the views of your organization on the Mineral Institute's program are in—seem to be in direct opposition to those of the official Administration position?

Mr. BEEBE. I think perhaps we're closer to the problem. Certainly the people at the Mining Congress, both its members and its staff, confront these problems every day. They are—they can't indulge in the luxury of dealing with mining as if it was one big large lump of something that could be viewed as all the same across the board, it in fact is many sub-industries with a variety of problems.

And it's very special nature has led us—well, I could give an example: on behalf of the universities, a number of company representatives joined with university representatives and called upon the National Science Foundation to see if there was something the National Science Foundation could do specifically for the mining industry.

Well it turns out that for good reason the National Science Foundation does not direct its funding towards industry-defined purposes. Now many of us would have said well that means that they're anti-mining or something, it's not that, it's that the unique nature of mining as an industry has put it in a position where it depends upon research and educational institutions which don't easily fit the mold of the standard education in chemistry or physics or something of that kind.

It isn't that there isn't room for improvement in our college curricula and so forth, but that we still need to depend upon some of these specialized institutions, just as we have schools of agriculture in many of the states, in fact all of the land grant colleges.

Mr. VALENTINE. How old is this agency?

Mr. BEEBE. The Mining Congress?

Mr. VALENTINE. No, excuse me, the Bureau, the Bureau of Mines.

Mr. BEEBE. It's quite old, I don't have the precise year. 1910.

Mr. VALENTINE. 1910?

Mr. BEEBE. Yes, sir.

Mr. VALENTINE. I thought it was much older than that.

When you talk about being able to attract young men and women into educational pursuits that are useful in producing more mining engineers, don't you really suffer from the fact that the Bureau of Mines is kind of like the girl next door when compared to the gal in the city or the next town, you know. I mean, compared to NASA and all the sophisticated and glamorous things around, we think of the Bureau of Mines as like the Bureau of Standards: old fashioned oak paneling and high ceilings...

What do you say to that? Do you need—

Mr. BEEBE. I say that in many respects you're right and I think that one of the things we need—one of the purposes the Bureau can serve, but it can't serve it alone, it needs the industry and the universities to cooperate together, is we have to improve our communications, not just communications of, you know, this is a good idea that I can put down on paper in the form of a technical publication and a company scientist will pick this up and say Here's something I can use, but the kind of communication that will lead to a greater understanding and trust between the academics and the people who actually apply the things at the working level.

And here I see the Bureau, as well as the American Mining Congress, as playing a very, very important role in bridging that gap.

It's a real gap. There are probably only a handful of people in the industry who feel even comfortable talking with their counterparts in the universities and vice versa. We have to improve that. We have to recognize that we've got to make research interesting and engaging for the researchers, but at the same time we have to look at how we can judge our own priorities and try to get from the process some things that we can adapt to our needs.

Mr. VALENTINE. Well, sir, we thank you very much for sharing these thoughts with us and for being here today. It was an excellent presentation. And we thank all of the others who were here today to show interest in these proceedings.

And with that, the Subcommittee will stand adjourned.

[Whereupon, at 3:25 p.m., the meeting of the Subcommittee was adjourned.]

APPENDIX



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MAR 29 1989

March 27, 1989

The Honorable Tim Valentine
Chairman
Subcommittee on Transportation,
Aviation and Material
Committee on Science, Space and
Technology
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

At the March 21, 1989, Subcommittee hearing on the proposed FY 1990 budget for the U.S. Bureau of Mines you asked the American Mining Congress witness, Robert R. Beebe, to submit certain information for the hearing record.

Mr. Beebe was asked if the American Mining Congress (AMC) had made known to the Bush Administration its position on the National Critical Materials Council. During the transition period from the Reagan to the Bush Administration AMC submitted position papers on a variety of issues including one supporting a strong and active National Critical Materials Council. After President Bush has completed making appointments to the positions connected with the National Critical Materials Council AMC intends to present its case in person.

We continue to believe that the council should be given a good faith opportunity to carry out its mandate and that it must have the authority and means to pursue its mandate.

Sincerely,

Keith R. Knoblock
Vice President

cc: Robert R. Beebe